Department of Environmental Protection
Bureau of Land & Water Quality Mar.2000

O&M Newsletter

A monthly newsletter for wastewater discharge licensees, treatment facility operators and associated persons

Some thoughts about financing repairs and replacements

Municipalities, states and the federal government have, in the last 25 years, spent over $500 billion to build wastewater treatment facilities across the nation. The construction and operation of these treatment facilities have greatly improved the quality of our lakes, rivers and streams. The water pollution control program has been extremely successful in restoring the nation's waters and we should all be proud of our accomplishments.

Recent media coverage, however, has drawn great attention to the condition of the country's infrastructure… things like roads, bridges, sewers and other publicly owned facilities that make up the framework supporting much of our modern life. Many parts of this infrastructure, including those wastewater treatment facilities designed and built in the 1970's and early 1980's, are past or near their design lives.

A recent review of community wastewater budgets indicates that many facilities are financially well managed and have set aside adequate funds for repairing or replacing worn out infrastructure. We congratulate the managers of those facilities and urge them to continue their good work. However, we are concerned that in many treatment facility budgets, the line items for repair or replacement of major parts of the facility is missing or grievously underfunded.

The continued improvement of water quality in Maine depends on preserving and upgrading wastewater collection and treatment systems in this state. Many treatment plants have undergone or will face costly upgrades or replacements in the near future. We strongly recommend that you establish a replacement fund as a line item in your budget. We further recommend that this line item be adequately funded and that the money set aside in this account not be used for anything other than repair/replacement of major equipment or structures in your facility. A replacement fund is like a savings account. Although we know that your customers are concerned about rising utility costs, any money in a replacement fund will save you some, if not all of the expense of borrowing the money needed for major plant upgrades. The following shows one example of how establishing a replacement fund can save considerable money when compared with borrowing at the time of construction.

This example was taken from an actual treatment facility.

Cost of equipment replacement = $153,220
Interest earned on savings = 4%
Interest paid on loans = 6%
Time Frame = 10 years

Sinking Fund Factor: This is a number calculated from the interest rate and the number of years for which money will be invested. It is used to determine how much money must be put away every year to get a certain amount at the end of the investment period. In this case, investing money for 10 years at 4% yields a Sinking Fund Factor = 0.07587.

Capital Recovery Factor: This is a number calculated from the interest rate and the number of years for which money will be borrowed. It is used to determine how much money must be paid every year to pay back a loan. In this case, borrowing money for 10 years at 6% yields a Capital Recovery Factor = 0.149.

Saving

Annual Amount = Cost * Sinking Fund Factor
Annual Amount = $153,220 * 0.07587
Annual Amount = $11,625

Borrowing

Annual Amount = Cost * Capital Recovery Factor
Annual Amount = $153,220 * 0.149
Annual Amount = $22,830

As you can see, saving for the purchase cost the customers $11,625 while borrowing the same amount to complete the needed repair costs $22,830, almost ***twice*** as much! By having an equipment replacement fund and allocating money to that fund every year, the customers will ultimately save money and the management of the treatment facility can avoid the headaches and expense of finding an emergency when the inevitable breakdown happens.

We hope you will consider this matter seriously. If you have any questions, contact Dick Darling at the Maine DEP, Bureau of Land and Water Quality, Division of Technical Assistance at 287-7806.

Dick Darling

Spring 2000 Exam

The Spring Wastewater Exam will be given in the usual locations on Wednesday, May 10, 2000. Applications must be mailed to the DEP on or before March 24, 2000.

Dick Darling

For Practice

1. Very low Chlorine residual concentrations, especially in colored effluents, should be measured by
   a. Amperometric Titration
   b. DPD Colorimetric methods
   c. Winkler Method
   d. Iodometric Method

2. Given the following data, how much sludge should be wasted?

Plant flow	1,250,000 gallons/day
Current F:M ratio	0.18
Target F:M ratio	0.20
MLSS Concentration	3083 mg/l
MLVSS/MLSS ratio	0.82
Aeration Tank Volume	450,000 gallons
Influent BOD	186 mg/L
Waste Sludge SS	8300 mg/l

a. none
b. 11,196 gallons
c. 12,473 gallons
d. 13,710 gallons

3. When a gasoline-powered fan is used to ventilate a confined space, you must take care to
   a. avoid blowing air into the basements of nearby homes
   b. avoid blowing air into collection mains
   c. blow only cold air into confined spaces
   d. prevent exhaust gasses from the blower motor or nearby vehicles from being drawn into the blower intake

4. The part of centrifugal pump which move the liquid is the
   a. Volute
   b. Packing gland
   c. Valve
   d. impeller

Mercury Pollution Prevention Planning

During the training sessions we recently conducted to help operators write their Mercury Pollution Prevention Plans, we often referred to a document called the "Wisconsin Mercury Sourcebook" The document contains information about mercury sources and might be very helpful to an operator working with a particular customer. The sourcebook is available on the internet and the individual appendices that deal with particular sources can be downloaded in Adobe Acrobat PDF File format. The Internet Address for the Wisconsin Sourcebook is http://www.epa.gov/glnpo/bnsdocs/hgsbook/index.html

RECENT AND UPCOMING TRAINING COURSES

March 7, 2000 in Augusta, ME, Water Bureau Issues Briefing – approved for 6 hours, sponsored by JETCC (207) 767-2649
*****
March 9, 2000 in Presque Isle, ME, Biosolids Utilization- approved for 5 hours, sponsored by Maine Rural Water (207) 729-6569.
*****
March 9, 2000 in Topsham, ME, Pump Application, Selection and Maintenance - approved for 6 hours, sponsored by Maine Rural Water (207) 729-6569.
*****
March 16, 2000 in Augusta, ME, Preliminary Treatment Options – approved for 6 hours, sponsored by JETCC (207) 767-2649
*****
March 22, 2000 in Presque Isle, ME, Troubleshooting Activated Sludge – approved for 6 hours, sponsored by JETCC (207) 767-2649
*****
April 4, 2000 in Waterville, ME, Polymer Sealant Repair & P.M. Systems – approved for 6 hours, sponsored by JETCC (207) 767-2649
*****
April 10 & 11, 2000 in Hinkley (SAPPI - S.D. Warren Mill), Basic Identification of Filamentous Organisms in Activated Sludge – approved for 12 hours, sponsored by JETCC (207) 767-2649
*****
April 12, 2000 in Bangor, ME, Living with the New Biosolids Regulations – approved for 6 hours, sponsored by JETCC (207) 767-2649

April 25, 2000 in Portland, ME, Performance Management – approved for 6 hours, sponsored by NEIETC (978) 323-7929
*****
April 28, 2000 in South Portland, ME, Basic Chemistry for Plant Personnel – approved for 6 hours, sponsored by JETCC (207) 767-2649
*****
May 1,2 & 3, 2000 in North Conway, NH, Advanced Process Control for Activated Sludge – approved for 15 hours, sponsored by NEIETC/JETCC (978) 323-7919
*****
May 17, 2000 in Skowhegan, ME, Troubleshooting Activated Sludge – approved for 6 hours, sponsored by JETCC (207) 767-2649
*****
May 23, 2000 in Portland, ME, Using Computerized Databases in the WWTP – approved for 6 hours, sponsored by JETCC (207) 767-2649

Dick Darling

Answers to *For Practice:*

1. a. Small chlorine residuals in colored water samples must be measured using amperometric titration (Standard Methods)

2. d. F:M Ratio = (Pounds BOD)/(Pounds MLVSS)

   Pounds BOD = 182 X 1.125 X 8.34 = 1,708 lbs

   Pounds MLVSS = 3083 X .45 * 8.34 * 0.82 = 9,489 lbs

   F:M ratio = 1,708/8540 = 0.20

   Target F:M = 0.20 = 1708/ Lbs MLVSS
   Lbs MLVSS = 1,708/0.20 = 8540 lbs

   Solve using the data given: Pounds To Waste = (9489 – 8540) = 949 lbs

   Determine the gallons to be wasted:
   Gallons wasted = $\frac{\text{(pounds wasted * 1,000,000)}}{\text{(waste sludge concentration * 8.34)}}$
   Gallons Wasted = (949 * 1,000,000)/(8300 * 8.34) = 13,710 gallons

3. d. Exhaust gases from any gasoline motors contain carbon monoxide, which is a poisonous gas.

4. d. In a centrifugal pump, the impeller spins the liquid causing it to move from the center of the impeller to the outside.

Dick Darling